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A Template for Web-Based Interactive Distance Learning

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A Template for Web-Based Interactive Distance Learning

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Abstract

ClassCast, an R&D project that provides an interactive environment for distance learning is the major emphasis of this paper. The ClassCast project was initiated to experiment with real-time streaming audio and video technology for Webcasting of live classroom lectures via the Internet. The IUPUI campus has, at present, one classroom which is equipped with the necessary equipment to allow instructors to broadcast course content to distance education students. Students can communicate with the instructor or with fellow students in either a public or private mode via an Interactive Relay Chat [IRC]. The instructor can respond to questions posed by virtual participants using either the IRC or audio mode. The ClassCast framework provides a list of participants for instructor and students alike. Through the inclusion of push technology, in this framework, electronic PowerPoint slides, which have been converted to HTML format, are sent to all ClassCast participants' workstations. After each live ClassCast session, the lecture session is archived on a RealServer for future reference by the course participants.

Description

Over the past year and a half, the Purdue University School of Engineering and Technology, Department of Computer Technology, at Indiana University Purdue University Indianapolis has been involved in Webcasting [live real-time streaming audio and video broadcasting over the Internet]. This from of Web-Based distance education has evolved quickly, within the department, due to the implementation of the ClassCast environment. Our sojourn from research and theory to practice has taught us much, but we still have much to learn. Currently, Webcasting courses use an interactive environment known as ClassCast [Figure 1], within the Oncourse environment [Endnote A], to involve distant learners in content presentations. ClassCast is a Web window containing five frames. One frame [Area E] contains the output from RealPlayer, thus presenting the audio and video output of the live class. A second frame [Area A] involves push technology. In this frame, PowerPoint slides that have been converted to hypertext markup language [HTML] format are presented which support course content and are pushed to any virtual learner logged on to the ClassCast environment during Webcasting of a presentation. A third and fourth frame [Areas B and C] consist of an Interactive Relay Chat [IRC] format where distant learners can respond to audio questions from the instructor or where they can present typed questions to the instructor, who then can respond either verbally or via a typed response. This IRC format, especially Area B, allows virtual and all physical students to see all questions and responses from all participants. Area C is where the message from either the distant learner or the instructor is typed prior to being pushed to class participants. A fifth frame [Area D] contains the user identification of all distance learners who are logged on the class presentation. This allows the instructor and fellow class members to know who is participating in the virtual classroom environment. All presentations utilizing Webcasting are also archived and stored on a Real Server so that class presentations are available twenty-four hours a day, seven days a week for review by all students.

Our journey from the beginning to that explained above has been one of continual learning. The format is a change from our first Web-Based presentation technique utilized to present course content to distance learners. Originally students had to open a Web browser and a RealPlayer window on their desktop. During the first iteration of the course, the twenty-two distance learners had to type in each URL that was verbally given by the instructor, since push technology was not a part of the user interface. This created many problems for both students and instructor alike. Communication between content presenter and distant learner was not possible, due to the lack of an IRC interface. Therefore, questions from virtual learners and clarifications for these learners had to be handled via e-mail, post content presentation. To correct such problems, David Mills, an employee of WebLab at IUPUI, and I began to discuss and design a more interactive distance learner interface. . The current ClassCast interface is the result of approximately eight months of discussion and design and programming work. Getting all five frames to function as a unit, which has made it easier for the distant learner to truly get involved in the class, took some innovative thought and programming on the part of David Mills. For more information on the programming aspect of the ClassCast software you can contact David at dtmills@iupui.edu.

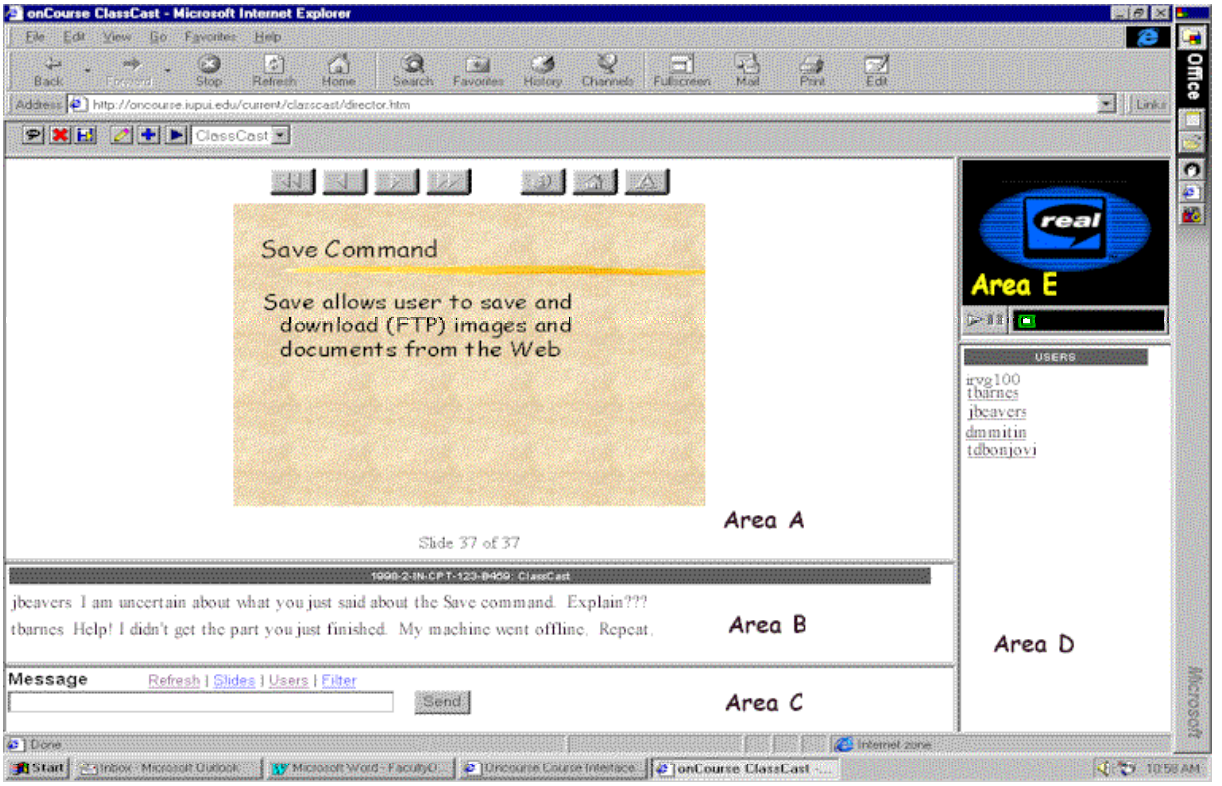

Figure 1. ClassCast Interface

The second time the course was presented, the push technology frame and the RealPlayer frame of the ClassCast interface were available for utilization. This was a step in the right direction. I began to utilize the PowerPoint slides converted to an HTML format as content aids. Now the thirty virtual learners did not have to type in URLs and they were able to concentrate more on the audio and video signals that they were receiving. However, as an instructor, I still did not know who was in the virtual classroom, which distance learners had questions concerning the content being presented, and no ability to clarify points of contention immediately to those with questions. I was also unable to determine the percentage of distance learners who were utilizing mainly the archived presentations versus being participants in the synchronous distance environment.

By the third iteration of the course the IRC interface and the userlist frames were complete. The fifty-eight virtual learners could now concentrate of the course content with few distractions. However, I was honored to have a hearing-impaired participant and several second language speakers during this course session. I focused on the hearing-impaired student and the signer who accompanied the student during class presentations. I focused the camera on the signer. I felt that this would assist virtual hearing-impaired students in comprehending the slides that were being pushed during the class. Unfortunately, the RealEncoder 4.0 that we currently use can only encode and broadcast at one bandwidth. In order to reach the widest audience, the department had elected to utilize the bandwidth that could be received by a 28.8 modem. This speed of capture makes the video signing seem to come across as slow motion and the hearing-impaired student stated that it was not helpful to focus on the signer unless the speed of presentation could be more closely related to real life motion. The student stated that it would be better to have close captioning of the complete text in real time to assist in the comprehension of the material being pushed to the virtual learners.

During the fourth iteration of the course the student population has grown to sixty-two. The major comment of the virtual students during this iteration has been that they cannot hear the questions and comments presented by those students who are physically present in the classroom environment. This necessitates that the instructor repeat all the comments and questions presented by those physically present. However, the growth of the student population would indicate that this

form of presentation has been well accepted by the student population at the university, even if they are unable to hear the physical student's comments. This is another area that we hope to improve upon in the near future.

Close Captioning

This would require something like RealProducer G2, which can encode one file, which can handle multiple bandwidths and would be received at the correct bandwidth depending upon the modem speed of the recipient. Close captions are possible with SMIL software but not in a real time mode. I have recently begun work on an attempt to have real time close captioning become a part of the ClassCast environment. I feel that close captioning would not only assist the hearing-impaired students but would also assist second language speakers in acquiring a better comprehension of the content presented.

Initial Setup Cost

The initial cost of establishing the classroom environment was approximately $20,000.00. Included in this cost was the following:

- Two video cameras,
- RealEncoder software,
- A Pentium based PC utilized for encoding,
- A sound mixer,
- A wireless microphone,
- A projection unit,
- An instructor work station, and
- A rack to store the equipment.

In addition to the classroom equipment the WebLab purchased a RealServer for Webcasting the synchronous delivery of the course content and the license for the RealServer software. This cost was the responsibility of the WebLab and was not the responsibility of the department of computer technology.

Purpose

The purpose of ClassCast is to design a presentation interface, which can involve a diverse student population. IUPUI is an urban university located on 285 acres of land just west of the center of the city. It is a commuting campus of approximately 28 thousand students. The student population commutes from the city and surrounding counties. The average age of the student population, although on a downward trend, is approximately 26. Approximately 88 percent of the student population are employed either full-time or part-time. With such a diverse student population we have made an attempt to present course content in a manner that we serve the needs of our students. We chose to create a format where students could participate in a physical setting, in a synchronous virtual setting, or in an asynchronous virtual setting. Such an environment covers the many different learning and lifestyles of the students whom make up our urban commuting campus environment. Utilizing this presentation method, students can join the live presentations from any location, which has Internet access. They need not take the fifty-mile drive to campus or fight the rush hour traffic. If a dependent is sick, they can stay at home and care for the individual without missing the class session.

We are constantly striving to add enhancements necessary to empower distant learner in content presented. We hope that an enhanced ClassCast environment in conjunction with the Oncourse environment would assist in the ushering in of a new media format for secondary and post secondary education when presented to virtual learners.

Endnote A: For more information concerning the Oncourse environment at IUPUI you may want to visit: http://oncourse.iupui.edu/Current/

Endnote B: For more information concerning the availability to other institutions send e-mail to: Dr. Ali Jafari, Computer Technology Department, IUPUI jafari@iupui.edu